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ABSTRACT

A study examined the predictive validity of two methods of prior knowledge assessment: free association and prediction. Subjects, 72 sixth graders from suburban public and private schools, were divided into four groups: standard free association; standard free association plus prediction; definitional free association; and definitional free association plus prediction. Subjects read two expository and two narrative texts, were asked to free associate and/or predict passage elements, retold the passage, and answered comprehension questions. Data from the 57 students whose comprehension was above 50% on at least one passage were subjected to multivariate analysis. Results indicated that: (1) although definitional instructions did not yield higher prior knowledge scores than free association instructions, the correlations between the knowledge scores and comprehension of narrative text for the two instructional groups were different; (2) in expository text, none of the correlations between responses to concepts and retelling or comprehension were significant in either instructional condition; (3) prediction of main ideas prior to reading was correlated with retelling and comprehension of expository text, but less so with narrative text; and (4) the number of correct main ideas predicted was very low. Findings suggest that definitional instruction tapped more directly what students knew, and did not know, about concepts. (Nineteen references are attached.) (RS)

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Assessing the Predictive Validity of Prior Knowledge Assessment

Research on adults and children has demonstrated that knowledge consistent with information presented in text is related to higher text comprehension. These results have been found when researchers assumed content knowledge through ethnic membership (Steffensen, Joag-Dev, & Anderson, 1978) or religious affiliation (Lipson, 1983) or when prior knowledge was directly assessed by multiple choice (Pearson, Hansen & Gordon, 1979; Recht & Leslie, 1988; Stevens, 1980) or free association (Langer, 1984; Taft & Leslie, 1985). Schema theory (Anderson & Pearson, 1984) suggests that knowledge is organized into abstract representations which provide slots to which incoming information is connected. Thus, new information is more readily stored and retrieved because it is related to previously existing organized information.

Prior knowledge assessment has recently come under greater scrutiny because measures of knowledge have appeared on state assessment devices (Leslie & Karbon, 1990; Valencia, Stallman, Commeyras, Pearson & Hartman, 1991). When tests are used for making high stakes decisions such as grade retention and program placement the validity of the test components is critical. If prior knowledge assessments are to be included on assessment devices, their use in explaining comprehension scores must be validated. Valencia and Stallman (1989) compared the correlations between two prediction tasks and comprehension. Given a topical prompt, students were asked either to indicate the likelihood of statements being in a passage or to write ideas

that would be in the passage. Their results did not support one prediction task over the other, both correlated similarly with comprehension.

The purpose of the present study was to examine the predictive validity of two methods of prior knowledge assessment: free association and prediction. Free association has been found to be correlated with comprehension (Langer, 1984; Taft & Leslie, 1985). The present study examined two different sets of instructions to free association concepts to examine whether one set of instructions led to higher scores, or was better at predicting comprehension. The instructions differed in the precision of response indicated to the student.

One condition gave standard, very general, free association instructions. The student was told to "say what you think of" when a concept was presented. It was reasoned that given these instructions, students might generate related associations indicating the breadth of knowledge the student has with the concept, yet a precise meaning might not be given. For example, if a student said, "blacks and whites", and "Martin Luther King", to the concept "segregation" we might infer that the student had some knowledge of concepts related to segregation but we can't infer that the meaning of the concept is understood. Elementary grade students often do not give associations that allow us to determine whether or not they know the meaning of the word. That is, they do not give definitions, antonyms or synonyms very often. They tend to give examples based on criterial attributes of the concept (Bruner, 1956), or personal experiences. It is not

clear whether they do not give higher order, or more abstract responses because of the generality of the instructions, or because they do not possess the ability to abstract concepts.

To examine whether more precise instructions would generate definitional attributes of concepts, the second type of instructions asked students directly, "What does XX mean?" or "Who is/was YY?". These instructions have the advantage of asking students for a precise, definition type response. Thus, students may be more likely to give such a response, or if they aren't familiar with the concept, say, "I don't know".

The second type of prior knowledge measure examined was prediction of text content. Valencia and Stallman (1989) used written prediction tasks as measures of prior knowledge and found low to moderate correlations with comprehension, particularly on expository text. Other research on prediction has examined how students make predictions during reading and whether they verify the accuracy of their predictions. Afflerbach (1990a) found that high prior knowledge aids adults in predicting text content and structure, as well as in generating main ideas. Afflerbach (1990b) found high prior knowledge to be related to the frequency of predictions in stories and essays. Type of text did not affect the frequency of predictions.

Our prediction task is similar to the initial hypothesis strategy of Afflerbach (1990a). It is a single prediction <u>before</u> reading. Also, like Valencia and Stallman (1989), students were given some information from which to make predictions before reading. Students were asked to use the title of the selection

and the free association concepts to which they had responded and make a prediction of what the selection would be about. It was reasoned that students who could interrelate the concepts and the title of the passage and make correct main idea predictions about the content of the text would be more likely to comprehend it than students who would make fewer correct predictions.

Method

Subjects. Students were 72 sixth graders from suburban public and private schools. Standardized achievement test results indicated that the students were generally average to above average readers.

Materials. Narrative and expository selections from the Qualitative Reading Inventory (Leslie & Caldwell, 1990) were used. All passages contain a free association test of prior knowledge. Comprehension is assessed through retelling and answers to comprehension questions. Passages on the QRI range in readability from primer through junior high.

Procedure. Each student was seen individually by one of the authors. Word lists were given from the QRI to determine an appropriate readability level of passages with which to begin. A practice free association task was given and the examiner provided feedback and modeled alternative responses. Students were then given a passage to read. They were told the title of the selection and given one of two sets of directions for the free association task. Students in the Standard Free Association Condition, were asked, " What do you think of when I say.....?" (each concept is given). Students in the Definitional Condition,

were asked, depending on the concept, " What is XX, or Who is YY and what is s/he known for", or "What does ZZ mean?"

After responding to concepts, students in either of the prediction conditions, were asked, "Given the title, ABCD, and the concepts, XX, YY, ZZ, what do you think the passage will be about?" Thus, the experiment consisted of four groups: 1.) Standard Free Association, 2.) Standard Free Association plus prediction, 3.) Definitional Free Association, and 4.) Definitional Free Association plus prediction. After reading the selection, students were asked to retell it, and eight explicit and implicit comprehension questions were asked. Data presented here are those of the 57 students who read four sixth grade passages, two narrative and two expository, where comprehension on at least one passage was above 50%.

Scoring. Free association is scored on a 3-2-1-0 level of abstraction scale with a score of three representing definition, synonym, or antonym responses. A score of two is given for examples, defining characteristics or functions. One point is given for general associations, response to a part of the concept, and first hand experiences. No points are given for sound alikes, or other associations unrelated to the concept.

Prediction was scored in three ways: 1.) Proposition scoring: a point was given for the each proposition contained in the prediction which was in the text; 2.) Single main idea scoring: one point was given if the student accurately predicted the main idea of the text (judged against the first question on each passage in the QRI stated as the main idea of the passage;

3.) Multiple main idea scoring: one point was given for each main idea included in the prediction that was included in the text, whether or not any of them represented the main idea as identified on the ORI.

Results

To determine if instructions affected the dependent measures, a multivariate analysis of variance was conducted with Instructional condition (1-4) as the between-subjects factor, text type (narrative, expository) as the with n-subjects factor and free association, retelling and comprehension scores as the dependent variables. The mean proportion free association scores for Conditions 1-4 were .42 , .39, .46 and .46, respectively, on narrative text, and on expository text were . 5, .55, .57 and .61. The mean proportion retelling scores for Conditions 1-4 were .34, .34, .35 and .37 for narrative text and, .31, .29, .26 and .27 on expository text. The mean proportion comprehension scores for Conditions 1-4 were .60, .56, .57 and .62 for narrative text and .61, .59, .64 and .65 for expository text. The multivariate effects of instructions, $F(9, 124) = .89$ and the interaction of instructions by text type, $F(9, 124) = .60$ were not significant. The multivariate effect of text type was significant, $F(3, 51) = 29.12$, $p<.001$. Univariate tests found that proportionately more propositions were retold from narrative text (mean= .35) than expository text (mean = .28), $F(1, 53) = 12.85$, $p<.001$, yet students had more prior knowledge of the concepts from expository text (mean = .63) than from narrative text (mean = .44), $F(1,53) = 68.13$, $p<.001$. No differences were

found between comprehension of narrative (mean = .59) and expository (mean = .63) text.

The next question to be answered was whether free association instructions resulted in differential correlations with retelling and/or comprehension of text. Because the analyses reported above found no differences on any dependent measure attributable to instructions, the prediction/no prediction groups were collapsed within each instructional condition. Thus, the two standard free association conditions were combined, as were the two definitional conditions. Because of the possibility of differential correlations for narrative and expository text, the regression analyses were conducted separately. Results indicated that in the standard free association condition, free association responses were marginally related to retelling $r(31) = .34$ $p<.10$, but not related to comprehension $r(31) = .10$, of narrative text. In expository text, free association responses were not significantly related to retelling $r(31) = .25$ or comprehension $r(31) = -.10$. Results were somewhat different for the definitional condition where responses to the free association concepts were significantly related to retelling $r(26) = .46$, $p<.05$, and comprehension $r(26) = .64$, $p<.01$ of narrative text, but not to retelling $r(26) = -.24$ or comprehension $r(26) = .12$ of expository text.

The final question to be answered was whether prediction is correlated with retelling and/or comprehension. To answer this question both prediction groups were combined. The ability to predict multiple, correct main ideas correlated with retelling of

expository text, $r(27) = .51$, $p < .01$. The correlation with comprehension of expository test was of marginal significance $r(27) = .35$, $p < .10$. No significant correlations with narrative text were found.

Discussion

The findings indicate that although definitional instructions did not yield higher prior knowledge scores than free association instructions, the correlations between the knowledge scores and comprehension of narrative text for the two instructional groups were different. With definitional instructions, the correlations between prior knowledge scores and both retelling and comprehension of narrative text were significant. With standard free association instructions, the correlation between prior knowledge and retelling of narrative text was of marginal significance, and with comprehension of narrative text was negligible.

What did definitional instructions elicit in students that was more related to retelling and comprehension than responses to standard free association instructions? We propose that when students were given definitional instructions, if they knew the concept they were able to give definitional attributes of concepts, scored as 3 points. In addition, they did not give general associations, scored as 1 point, because the instructions asked for a more precise response. If students didn't know the concept they indicated as such, and received a score of zero. An examination of the frequencies of 0-1-2-3 point responses for the two instructional groups showed that the definitional condition

had somewhat more 0 point (38% vs. 22%) and 3 point (32% vs. 27%) responses than the free association condition. The free association instructions generated more 1 point responses (23%) compared to the definitional instructions (13%). Both groups produced similar percentages of 2 point responses (27% and 28%).

These preliminary results, suggest that definitional instructions tapped more directly what students knew, and didn't know, about concepts and this resulted in the higher correlations with retelling and comprehension of narrative text. Thus, these sixth graders were able to give somewhat more definitional attributes when prompted by instructions.

Knowledge of the free association concepts are only rarely directly assessed after reading on the ORI. Thus, knowing definitions of concepts prior to reading the selection does not directly result in a higher comprehension score. Rather the relationship is posited to be indirect; knowledge of the concepts represents a knowledge base related to the content of the selection. The relationship of prior knowledge to retelling is direct and indirect. Certainly if the passage contains information already known by readers, they will be more likely to remember it and retell it, than those who didn't know it prior to reading. In addition, it is posited that readers with relevant prior knowledge will be able to learn new information more readily (and thus retell it) because of the association of the new information to the old (Anderson & Pearson, 1984).

In expository text, none of the correlations between responses to concepts and retelling or comprehension were

significant in either instructional condition. It is not clear why associations or definition of concepts did not correlate with comprehension of expository text. An examination of the standard deviations of all measures finds similarity between text types, thus statistical characteristics of the data do not explain the results. Other researchers have found free association to concepts to be correlated with retelling (Leslie & Caldwell, 1990) and comprehension of expository text (Langer, 1984; Leslie & Caldwell, 1990; Taft & Leslie, 1985).

The finding that prediction of main ideas prior to reading is correlated with retelling and comprehension of expository text, but less so with narrative text, is consistent with the findings of Valencia and Stallman (1989), although their correlations on expository text were also quite low (mean= .23). In contrast, researchers who examined the frequency of expert readers' ongoing predictions in narrative and expository text during think-alouds, found that readers' with higher knowledge made more predictions independent of text type (Afflerbach, 1990b; Olson, Mack & Duffy, 1981). It is likely that the age and task differences among these studies contributed to the different results.

In the present study, the number of correct main ideas predicted was very low. The mean number on narrative text was 1.21 and on expository was .70. The relationship of the means and standard deviations on the text types were similar, thus no statistical reason for the differential correlations on narrative and expository text was likely. Perhaps the ability to integrate concepts and the title of the selection is more related to

children's retelling of expository text because of the greater difficulty of expository text for these students. Recall that fewer propositions were retold from expository than narrative text, despite higher knowledge scores on expository text. Perhaps knowledge becomes more important when text is harder (Carver, 1992). The difficulty of expository text lies in its less familiar structure and comprehension of its content requires understanding of the logical connections among concepts (Spiro & Taylor, 1987). In contrast, comprehension of narrative text can occur from an understanding of goal-based action of characters which is more familiar to children. Thus, although more correct main idea predictions were made on narrative texts, students could retell and comprehend narrative text whether or not they could make main idea predictions.

The relationship between prior knowledge and comprehension likely depends upon the amount and type of information given in the knowledge assessment procedure (e.g., single words, phrases, specific vocabulary, general themes), instructions given to the student, and how comprehension is assessed. The complexity of knowledge assessment has been recognized (Rowe & Rayford, 1987; Valencia et al., 1991) and our future research will examine the different ways of measuring prior knowledge and their relationship to retelling and comprehension of narrative and expository text.

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